RADIO SERVICE BULLETIN

ISSUED MONTHLY BY BUREAU OF NAVIGATION, DEPARTMENT OF COMMERCE

Washington, May 1, 1923—No. 73

CONTENTS.

	Page.
Abbreviations	1
New stations	2
Alterations and corrections	5
Miscellaneous:	
Stations violating section 4, act of August 13, 1912	10
Wave lengths and hours for vessels of North Atlantic ice patrol service	10
Alaska stations reopened	10
Title of radio inspectors changed	10
New international list of radiotelegraph stations	10
Information from the Hydrographic Office	10
Information from the Berne bureau	11
Miscellaneous—Continued.	
Amendments to regulations, broadcasting stations	11
Regulations for broadcasting stations	12
Violation of act of August 13, 1912, by broadcasting stations	13
Regulations and specifications governing the licensing and use of broadcasting development radio stations	13
Loading coil and condensers for use with simple receiving sets	14
Decimal classification of radio subjects	14
References to current radio periodical subjects	15
Radio signals of standard frequency	20

ABBREVIATIONS.

The necessary corrections to the List of Radio Stations of the United States and to the International List of Radiotelegraph Stations, appearing in this bulletin under the heading "Alterations and corrections," are published after the stations affected in the following order:

Name =Name of station.
Loc. =Geographical location: O=west longitude, N=north latitude, S=south latitude.
Call =Call letters assigned.
System =Radio system used and sparks per second.
Range =Normal range in nautical miles.
W. l. =Wave lengths assigned: Normal wave lengths in italics.
Service =Nature of service maintained.
PG=General public.
PR=Limited public.
RC=Radio compass station.
P=Private.
O=Government business exclusively.
Hours =Hours of operation:
N=Continuous service.
X=No regular hours.
m=a. m. (12 m=midday).
s=p. m. (12 s=midnight).
Rates =Ship or coast charges in cents: c.=cents. (The rates in the international list are given in francs and centimes.)
I. W. T. Co. =Independent Wireless Telegraph Co.
R. C. A. =Radio Corporation of America.
S. O. R. S. =Ship Owners' Radio Service.
C. w. =Continuous wave.
I. c. w. =Interrupted continuous wave.
V. t. =Vacuum tube.
FX =Fixed station.
U. S. L. =After operating company denotes that the change applies only to the List of Radio Stations of the United States.

NEW STATIONS.

Commercial land stations, alphabetically by names of stations.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations published by the Berne bureau.]

Station.	Call signal.	Wave lengths.	Service.	Hours.	Station controlled by—
Chomly, Alaska [1]	KDP	300, 550, 600	FX	.....	Alaska Consolidated Canneries.
Pybus Bay, Alaska [2]	KFG	300, 550, 600	FX	.....	Do.
Quadra, Alaska [3]	KHD	300, 550, 600	FX	.....	Do.
Rose Inlet, Alaska [4]	KJC	300, 550, 600	FX	.....	Do.
Tee Harbor, Alaska [5]	KQP	300, 550, 600	FX	.....	Do.
Yes Bay, Alaska [6]	KRU	300, 500, 600	FX	.....	Do.

[1] Loc. (approximately) 0.132° 20′ 00″, N. 55° 15′ 00″.
[2] Loc. (approximately) 0.134° 00′ 00″, N. 57° 20′ 00″.
[3] Loc. (approximately) 0.130° 48′ 00″, N. 55° 06′ 00″.
[4] Loc. (approximately) 0.132° 59′ 00″, N. 54° 57′ 00″.
[5] Loc. (approximately) 0.134° 45′ 00″, N. 58° 25′ 00″.
[6] Loc. (approximately) 0.131° 48′ 00″, N. 55° 55′ 00″.

NOTE.—System for all of the above-named stations is R. C. A., 240; range, 150; hours, 8–10 a. m. and 7–10 p. m.

Commercial ship stations, alphabetically by names of vessels.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations published by the Berne bureau.]

Name of vessel.	Call signal.	Rates.	Service.	Hours.	Owner of vessel.	Station controlled by—
Arctic	KFHT	8	PG	X	H. Liebes & Co.	R. C. A.
Dickenson	KFHG	8	PG	X	Commercial Pacific Cable Co.	Do.
Loki	KDGD	8	PG	X	Standard Oil Co. of New Jersey.	Do.
Mazatlan [1]	KUBQ	8	PG	X	California-Mexico S. S. Co.	Do.
Restless	KFGW	.....	.....	.....	.....	
Roosevelt	KFHN	.....	.....	.....	.....	
Socony 83	KVAO	8	PG	X	Standard Oil Co. of New York.	Do.
St. Katherine	KFHE	.....	PG	X	Red Salmon Canning Co.	
Virginia Olson	KFHM	.....	PG	X	Oliver J. Olson	
Worrell Clarkson	KFHK	.....	PG	X	Kinsman Transit Co.	Do.

[1] Range, 200; system, R. C. A., 1000; w. l., 330, 450, 600.

Commercial land and ship stations, alphabetically by call signals.

[b—ship station; c—land station.]

Call signal.	Name.		Call signal.	Name.	
KDP	Chomly, Alaska	c	KFHN	Roosevelt	b
KFG	Pybus Bay, Alaska	c	KFHT	Arctic	b
KDGD	Loki	b	KHD	Quadra, Alaska	c
KFGW	Restless	b	KJC	Rose Inlet, Alaska	c
KFHE	St. Katherine	b	KQP	Tee Harbor, Alaska	c
KFHG	Dickenson	b	KRU	Yes Bay, Alaska	c
KFHK	Worrell Clarkson	b	KUBQ	Mazatlan	b
KFHM	Virginia Olson	b	KVAO	Socony 83	b

Broadcasting stations, alphabetically by names of cities.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922.]

City.	Call signal.	City.	Call signal.
Abilene, Tex.	KFGM	Lake Forest, Ill.	WABA
Alexandria, La.	KFFY	Laporte, Ind.	WRAF
Baton Rouge, La.	KFGC	Norman, Okla.	KFHC
Baudette, Minn.	HFGY	Omaha, Nebr.	KFFX
Berrien Springs, Mich.	KFGZ	Orange, Tex.	KFGX
Boone, Iowa.	KFGQ	Shreveport, La.	KFHF
Cheney, Kans.	KFGP	St. Joseph, Mo.	KFHD
Chickasha, Okla.	KFGD	St. Louis, Mo.	KFGJ
Dallas, Tex. (portable).	KFFZ	Utica, Nebr.	KFGV
Denver, Colo.	KFIC	Wichita, Kans.	KFHI
Harrisburg, Pa.	WABB		

Stations broadcasting market or weather reports, music, concerts, lectures, etc., alphabetically by call letters.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922.]

Call signal.	Station operated and controlled by—	Location of station.	Power (watts).	Wave length.	Frequency (kilocycles).
KFFX	McGraw Co.	Omaha, Nebr.	250	278	1080
KFFY	Pincus & Murphey	Alexandria, La.	100	275	1090
KFFZ	Al. G. Barnes Amusement Co.	Dallas, Tex. (portable).	20	226	1330
KFGC	Louisiana State University	Baton Rouge, La.	100	254	1180
KFGD	Chickasha Radio & Electric Co.	Chickasha, Okla.	20	248	1210
KFGJ	Missouri National Guard, 138th Infantry.	St. Louis, Mo.	100	266	1130
KFGM	Abilene Daily Reporter	Abilene, Tex.	100	233	1290
KFGP	Cheney Radio Co.	Cheney, Kans.	10	229	1310
KFGQ	Crary Hardware Co.	Boone, Iowa.	20	226	1330
KFGV	Heidbreder Radio Supply Co.	Utica, Nebr.	10	234	1340
KFGX	First Presbyterian Church.	Orange, Tex.	500	250	1200
KFGY	Gjelhaug's Radio Shop	Baudette, Minn.	20	224	1340
KFGZ	Emmanuel Missionary College.	Berrien Springs, Mich.	10	268	1120
KFHC	University of Oklahoma	Norman, Okla.	20	254	1180
KFHD	Utz Electric Shop Co.	St. Joseph, Mo.	10	226	1330
KFHF	Central Christian Church	Shreveport, La.	150	266	1130
KFHI	Charles V. Dixon.	Wichita, Kans., 411 Fannie Avenue.	20	224	1340
KFIC	Philip Laskowitz.	Denver, Colo., 611 Marion Street.	15	224	1340
WABA	Lake Forest College.	Lake Forest, Ill.	100	266	1130
WABB	Dr. John B. Lawrence.	Harrisburg, Pa.	10	266	1130
WRAF	The Radio Club (Inc.).	Laporte, Ind.	10	224	1340

Government land stations, alphabetically by names of stations.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations published by the Berne bureau.]

Station.	Call signal.	Wave lengths.	Service.	Hours.	Station controlled by—
Eagle Harbor, Mich.[1]	NCG	900	RC	X	U. S. Navy.
Hilo, Hawaii	NPH	597	O	N	Do.
Hot Springs, Alaska[2]	WXK	423, 440, 580, 620	O	X	U. S. Army.
Inglewood, Calif.[3]	NPX	365, 600, 975, 1851, 2400, 2750, 3950, 4525.	O	N	U. S. Navy.
Ofu, Samoa	NGX	300, 600	PG	N	Do.
Ruby, Alaska[4]	WVF	325, 450, 520, 600	O	X	U. S. Army.
Tau, Samoa	NCM	300, 600	PG	N	U. S. Navy.
Valdez, Alaska[5]	WXJ	1000, 1100, 1200, 1500	O	X	U. S. Army.
Virginia Beach, Va.[6]	NAM	597	O	N	U. S. Navy.
West Memphis, Ark.[7]	WYCJ		O		U. S. Army.

[1] System, U. S. Navy, 1000.
[2] Loc. 0.150° 58′ 15″, N. 64° 55′ 10″; range, 100; system, U. S. Army, v. t. telephone and telegraph.
[3] Loc. 0.118° 14′ 32″, N. 34° 03′ 05″; range, 850; system, U. S. Navy arc and spark.
[4] Loc. 0.155° 30′ 25″, N. 64° 42′ 20″; range, 100; system, U. S. Army v. t. telephone and telegraph.
[5] Loc. (approximately) 0.146° 17′ 00″, N. 61° 06′ 00″; range, 25; system, composite, v. t. telephone.
[6] Loc. 0.75° 58′ 58″, N. 36° 50′ 28″; range, 135; system, U. S. Navy.
[7] Range, 200; system, U. S. Navy, 1000.

NOTE.—Hilo, Ofu, and Tau are equipped with U. S. Navy apparatus.

Government ship stations, alphabetically by names of stations.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations published by the Berne bureau.]

Station.	Call signal.	Wave lengths.	Service.	Hours.	Station controlled by—
B. M. Harrod	WYCI		O		U. S. Army.
Gama	WYCE		O		Do.
Guide	NIJN		O	X	Coast and Geodetic Survey, Department of Commerce.
Henry Flad	WYCH		O		U. S. Army.
Inspector	WYCB		O		Do.
Iota	WYCF		O		Do.
Jupiter	WYCC		O		Do.
Kappa	WYCG		O		Do.
Saturn	WYCD		O		Do.
Vaughan	NITD		O		Coast Guard Service, Treasury Department.

NOTE.—All of the above-named vessels, which are operated and controlled by the U. S. Army, are equipped with U. S. Navy spark apparatus (1000), and the range is 200 miles.

Government land and ship stations, alphabetically by call signals.

[b—ship station; c—land station.]

Call signal.	Name of station.	Call signal.	Name of station.
NAM	Virginia Beach, Va.....c	WXK	Hot Springs, Alaska.....c
NCM	Tau, Samoa.....c	WYCB	Inspector.....b
NGX	Ofu, Samoa.....c	WYCC	Jupiter.....b
NIJN	Guide.....b	WYCD	Saturn.....b
NITD	Vaughan.....b	WYCE	Gama.....b
NPH	Hilo, Hawaii.....c	WYCF	Iota.....b
NPX	Inglewood, Calif.....c	WYCG	Kappa.....b
NUG	Eagle Harbor, Mich.....c	WYCH	Henry Flad.....b
WVF	Ruby, Alaska.....c	WYCI	B. M. Harrod.....b
WXJ	Valdez, Alaska.....c	WYCJ	West Memphis, Ark.....c

Special land stations, alphabetically by names of stations.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922.]

Station.	Call signal.	Wave lengths.	Station controlled by—
Altadena, Calif.	6XBF	Variable.	Altadena Radio Laboratory.
Baldwinsville, N. Y.	8XAV	200, 375.	J. E. Pago.
Cincinnati, Ohio (temporary).	8XAW	309.	U. S. Playing Card Co.
Eatontown, N. J.	2XAU	5 to 100.	Western Electric Co., 195 Broadway, New York, N. Y.
New York, N. Y (portable).	2XAV	5 to 100.	Do.
New York, N. Y.	2XAW	380, 405, 455, 485.	Ship Owners Radio Service.
Sand Springs, Okla.	5XBF	200, 220.	Halton H. Friend, Box 556.

Special land stations, grouped by districts.

Call signal.	District and station.	Call signal.	District and station.
	Second district:	6XBF	Sixth district: Altadena, Calif.
2XAU	Eatontown, N. J.		Eighth district:
2XAV	New York, N. Y. (portable).	8XAV	Baldwinsville, N. Y.
2XAW	New York, N. Y.	8XAW	Cincinnati, Ohio.
5XBF	Fifth district: Sand Springs, Okla.		

ALTERATIONS AND CORRECTIONS.

COMMERCIAL LAND STATIONS.

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations, published by the Berne bureau.]

AKUTAN, ALASKA.—W. l., 300, *600*, 1600.
ENSENADA, P. R.—Loc. 0.66° 55′ 50″, N. 17° 58′ 15″.
FORT MORGAN, ALA.—System, U. S. Signal Corps, 1000 and Simon, 1000; service, PG.
LAZY BAY, ALASKA.—System, composite, 460.
NEW ORLEANS, LA.—System, composite v. t. telephone and telegraph, and composite spark, 1000; rates, ship service 10 c. per word.
TAMPA, FLA.—Hours, 5 a. m.–12 midnight.
WILMINGTON, CALIF. (LOS ANGLES).—Range, 300; system, R. C. A., 1000; w. l., 300, 450, *600*.
Strike out all particulars of the following-named stations: Rockland, Me., and Rogers, Mich. (WCAF).

COMMERCIAL SHIP STATIONS, ALPHABETICALLY BY NAMES OF VESSELS.

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations, published by the Berne bureau.]

ABERCOS.—W. l., 300, 450, *600*.
ABSECON.—System, Kilbourne & Clark, 1000; w. l., 300, 450, *600*.
ADMIRAL FISKE.—System, R. C. A., 1000; w. l., 300, 450, *600*.
ADMIRAL MAYO.—R. W. Crosby owner of vessel.
ALADDIN.—W. l., 300, 450, *600*.
A. L. KENT.—Rates, 8 c. per word.
ALLEGHANY.—Station operated and controlled by I. W. T. Co.; rates, 8 c. per word.
AMOLCO.—Rates, 8 c. per word.
APUS.—Name changed to Charles R. McCormick; McCormick Intercoastal S. S. Co. owner of vessel.
ARAPAHOE (KFFM).—Range, 150; system, R. C. A., 1000; w. l., 300, 450, *600;* station operated and controlled by owner of vessel; rates, 8 c. per word.
ARGUS.—Name changed to Sidney M. Hauptman; w. l., 300, 450, *600;* McCormick Intercoastal S. S. Co. owner of vessel.
BAKERSFIELD.—W. l., 300, 450, *600*.
BARACOA.—Colombian S. S. Co. owner of vessel; station operated and controlled by I. W. T. Co.
BARBARA C.—Range, 150; system, R. C. A., 1000; w. l., 300, 450, *600*.
BAYTOWN.—System, R. C. A., 1000; w. l., 300, 450, *600*.
BAYWAY.—System, R. C. A., 1000; w. l., 300, 450, *600*.
BETHELRIDGE.—System, Navy-R. C. A., 1000; hours, X.
BIDWELL.—Sun Shipbuilding Co. owner of vessel.
BOGOTA.—Colombian S. S. Co. owner of vessel.
BOHEMIAN CLUB.—Atlantic Refining Co. owner of vessel.
BOSTON.—Range, 150; system, Cutting & Washington, 1000; w. l., 300, 450; *600;* station operated and controlled by I. W. T. Co.; rates, 8 c. per word.
BRIDGETOWN.—Colombian S. S. Co. owner of vessel.
BYLAYL.—Pocahontas S. S. Co. owner of vessel.
C. A. CANFIELD.—System, R. C. A., 1000.
CALVIN AUSTIN.—System, R. C. A., 1000; w. l., 300, 450, *600*.
CAMDEN (KRC).—System, R. C. A., 1000.
CAROLINAS.—W. l., 300, 450, *600*.
CARRABULLE.—System, Navy-R. C. A., 1000.
CASSIMIR.—Station operated and controlled by R. C. A.
CASTLE TOWN.—Chas. R. McCormick S. S. Co. owner of vessel; station operated and controlled by I. W. T. Co.
CATHERINE D.—W. l., 300, 450, *600*.
CAUTO.—W. l., 300, *600*.
CHILLICOTHE.—Range, 200; system, U. S. Navy, 1000; w. l., 300, 450, *600;* Columbia River Packers Association owner of vessel; station operated and controlled by owner of vessel; rates, 4 c. per word.
CITY OF ALAMEDA.—System, Navy-R. C. A., 1000; w. l., 300, 450, *600;* station operated and controlled by R. C. A.
COLLINGSWORTH.—System, Navy-Wireless Specialty Apparatus Co., 1000.
COLUMBIA.—Thomas Crowley owner of vessel.

COMMERCIAL GUIDE.—Range, 300; w. l., 300, 450, *600*.
CONVUS.—Planet S. S. Corp. owner of vessel.
COVEDALE.—Name changed to Muncove.
CRIPPLE CREEK.—System, Navy-Kilbourne & Clark, 1000; w. l., 300, 450, *600*.
CUPRUM.—Station operated and controlled by S. O. R. S. (U. S. L.).
DELFINA.—Baltimore S. S. Co. owner of vessel.
DELROSA.—Station operated and controlled by S. O. R. S.
DERBYLINE.—Station operated and controlled by I. W. T. Co.
DEROCHE.—Union Oil Co. owner of vessel.
DEVOLENTE.—Beacon Oil Co. owner of vessel.
DIRIGO.—W. l., 300, 450, *600*.
DUNGANNON.—Station operated and controlled by I. W. T. Co.
DURANGO.—Malston Co. owner of vessel; station operated and controlled by I. W. T. Co.
EASTERN GALE.—Range, 300; system, R. C. A., 1000; w. l., 300, *600*.
EDELLYN.—Name changed to Dorothy Luckenbach; Luckenbach S. S. Co. owner of vessel.
EDWARD PIERCE.—Rates, 8 c. per word.
EDWARD SEWALL.—Range, 150; system, R. C. A., 1000; w. l., 300, 450, *600;* station operated and controlled by owner of vessel; rates, 8 c. per word.
EELBECK.—Station operated and controlled by S. O. R. S.
ELDENA.—System, Navy-Lowenstein, 1000.
E. L. DOHENY, THIRD.—Pan-American Petroleum & Transport Co. owner of vessel.
E. R. STERLING.—System, composite, 1000; w. l., 300, *600;* rates, 8 c. per word.
FELIX TAUSSIG.—Rates, 8 c. per word.
FREDERIC EWING.—System, R. C. A., 1000.
FREEMAN.—Pocahontas S. S. Co. owner of vessel.
GOVERNOR JOHN LIND.—System, Navy, 1000.
HADNOT.—System, Navy, 1000; w. l., 300, 450, *600*.
HALO.—W. l., 300, 450, *600*, 1800; Cities Service Co. owner of vessel; station operated and controlled by R. C. A.
HALSEY.—Malston Co. owner of vessel; station operated and controlled by I. W. T. Co.
HALWAY.—W. l., 300, 450, *600*, 1800.
HERBERT G. WYLIE.—System, R. C. A., 1000.
HUMACONNA.—Range, 300; system, Navy-Lowenstein, 1000; w. l., 300, 450, *600*.
INDIAN.—W. l., 300, 450, *600*.
INSPECTOR.—Station operated and controlled by I. W. T. Co. (U. S. L.)
INTREPID.—System, R. C. A., 1000.
IRIS.—System, R. C. A., 1000.
JAMESTOWN.—Rates, 8 c. per word.
JAPAN ARROW.—W. l., 300, 450, *600*.
JONANCY.—Pocahontas S. S. Co. owner of vessel.
JUNEAU.—Station operated and controlled by owner of vessel.
KENNECOTT.—W. l., 300, 450, *600*.
KISHACOQUILLAS.—Station operated and controlled by I. W. T. Co.
LAKE GEBA.—Name changed to Southlands; station operated and controlled by S. O. R. S.
LAKE GRAPHITE.—Name changed to West Africa; station operated and controlled by S. O. R. S.
LANCASTER.—System, Navy-Lowenstein, 1000; w. l., 300, 450, *600*.
LEWIS K. THURLOW.—W. l., 300, *600;* rates, 8 c. per word.
LILLIAN LUCKENBACH.—Range, 300; system, Kilbourne & Clark, 1000; w. l., 300, 450, *600*.
LUBRICO.—Station operated and controlled by S. O. R. S. (U. S. L.).
MERIDEN.—E. K. Wood Lumber Co. owner of vessel.
MOUNT EVANS.—System, Navy-R. C. A., 1000; w. l., 300, 450, *600*.
MUNALBRO.—System, R. C. A., 1000.
MUNMOTOR.—System, Navy-R. C. A., 1000.
MURSA.—Station operated and controlled by S. O. R. S. (U. S. L.).
NARCISSUS.—W. l., 300, 450, *600*, 1800.
NORTH KING.—Range, 150; system, R. C. A., 1000; w. l., 300, 450, *600;* station operated and controlled by owner of vessel; rates, 8 c. per word.
NORTH LAND (KJD).—System, R. C. A., 1000.
NORTHLAND (WGJ).—Range, 150; rates, 8 c. per word.
OGONTZ.—System, Navy-Wireless Specialty Apparatus Co., 1000; w. l., 300, 450, *600*.
ONEIDA (KYP).—Range, 300; system, Telefunken, 1000; w. l., 300, 450, *600*.
ONEONTA.—Station operated and controlled by owner of vessel.
PAN-AMERICAN.—System, R. C. A., 1000.

PENNSYLVANIA SUN.—Sun Oil Co. owner of vessel.
PERFECTION.—Range, 300.
PETER H. CROWELL.—System, Navy-Simon, 1000; rates, 8 c. per word.
PETER KERR.—Station operated and controlled by owner of vessel.
PHYLLIS.—Station operated and controlled by R. C. A.
PLYMOUTH (KND).—C. H. Sprague & Son Co. owner of vessel.
PORTOLA PLUMAS.—Name changed to W. E. Hutton; Pure Oil S. S. Co. owner of vessel; station operated and controlled by R. C. A.
RADIANT.—System, R. C. A., 1000.
RAYO.—Standard Transportation Co. owner of vessel.
REDONDO (KYT).—Name changed to Delecto; system, R. C. A., 1000.
REDONDO (WBM).—Range, 200.
RICHCONCAL.—Beacon Oil Co. owner of vessel.
ROCHESTER.—System, R. C. A., 1000; w. l., 300, 450, *600*.
SANTA CECILIA.—System, R. C. A., 1000; w. l., 300, 450, *600;* Planet S. S. Corp. owner of vessel.
SANTA ISABEL.—System, R. C. A., 1000.
SEA SCOUT.—Range, 150; system, R. C. A., 1000; w. l., 300, 450, *600;* rates, 8 c. per word.
SIBONEY.—System, Navy-Lowenstein, 1000; and I. W. T. Co. arc; w. l., 300, 450, *600*, 1800.
SOCONY 85.—System, R. C. A., 1000; Standard Transportation Co. owner of vessel.
SOCONY 88.—System, R. C. A., 1000.
SOCONY 90.—Standard Transportation Co. owner of vessel.
STANWOOD.—Range, 150; system, R. C. A., 1000; w. l., 300, 450, *600*.
STAR OF RUSSIA.—Range, 150; system, R. C. A., 1000; w. l., 300, 450, *600;* station operated and controlled by owner of vessel; rates, 8 c. per word.
STEPHEN R. JONES.—Rates, 8 c. per word.
SUDURCO.—Rates, 8 c. per word.
SUSQUEHANNA (WEM).—Herman Kaczyk, owner of vessel; station operated and controlled by R. C. A.
SWIFTSURE.—System, R. C. A., 1000.
THOMAS P. BEAL.—Rates, 8 c. per word.
TIDEWATER.—Name changed to Isaac T. Mann; Pocahontas S. S. Co., owner of vessel.
TUSTEM.—Atlantic Refining Co., owner of vessel.
VACOIL.—Station operated and controlled by R. C. A.
VOLUNTEER.—System, Navy-Wireless Specialty Apparatus Co., 1000; w. l., 300, 450, *600;* station operated and controlled by R. C. A.
WAIMEA.—System, R. C. A., 1000; service, PG; station operated and controlled by R. C. A.; rates, 8 c. per word.
WALLINGFORD.—System, Navy-R. C. A., 1000; w. l., 300, 450, *600;* McCormick S. S. Line, owner of vessel.
WALLULA.—Station operated and controlled by owner of vessel.
WALTER D. NOYES.—Rates, 8 c. per word.
WARSZAWA.—Name changed to Stanley Dollar; Robert Dollar Co., owner of vessel.
WARWICK.—Union Oil Co., owner of vessel.
WEST CACTUS.—Station operated and controlled by I. W. T. Co. (U. S. L.).
WESTERN SPIRIT.—Station operated and controlled by I. W. T. Co. (U. S. L.).
WESTLAKE.—System, Navy-Kilbourne & Clark, 1000; w. l., 300, 450, *600*.
WEST NOMENTUM.—Station operated and controlled by R. C. A. (U. S. L.).
WEST TOTANT.—Station operated and controlled by R. C. A.
W. F. WHITE.—System, Navy-Wireless Specialty Apparatus Co., 1000; rates, Great Lakes service, 6 c. per word.
WHITNEY OLSON.—Oliver J. Olson & Co., owner of vessel.
WILLIAM A. MCKENNEY.—Rates, 8 c. per word.
W. S. MILLER.—W. l., 300, 450, *600*.
ZAPORA.—Range, 250.
Strike out all particulars of the following-named vessels: Barkhamstead, Coolcha, Lake Galisteo, Lincoln Land, Mauna Kea, and Yadkin.

COMMERCIAL LAND AND SHIP STATIONS, ALPHABETICALLY BY CALL SIGNALS.

KDBZ, *read* Charles R. McCormick; KEMN, *read* Muncove; KIJI, *read* Dorothy Luckenbach; KOKS, *read* Southlands; KOU, *read* Isaac T. Mann; KUMN, *read* W. E. Hutton; KUVD; *read* Sidney M. Hauptman; KYT, *read* Delecto; WLM, *read* Stanley Dollar; WZOA, *read* West Africa; strike out all particulars following the call signals KDPD, KOPS, KUFL, KUGL, KWL, WCAF, WLOU, and WME.

BROADCASTING STATIONS, BY CALL SIGNALS.

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1922.]

KDYS (Great Falls, Mont.).—W. l., 360 only.
KEFO (Hillsboro, Oreg.).—Correct call signal KFFO.
KFAU (Boise, Idaho).—W. l., 360 only.
KFAY (Medford, Oreg.).—W. l., 360 only.
KFBB (Havre, Mont.).—W. l., 360 only.
KFDF (Casper, Wyo.).—Station operated and controlled by Casper Community Radio Corp.; w. l., 360 only.
KLZ (Denver, Colo.).—W. l., 360 only.
KZN (Salt Lake City, Utah).—W. l., 360 only.
WAAW (Omaha, Nebr.).—W. l., 360 only.
WCAW (Quincy, Ill.).—W. l., 360 only.
WCM (Austin, Tex.).—W. l., 360 only.
WCX (Detroit, Mich.).—W. l., 400 only.
WDAJ (College Park, Ga.).—W. l., 360 only.
WEAU (Sioux City, Iowa).—W. l., 360 only.
WFAN (Hutchinson, Minn.).—W. l., 360 only.
WFAV (Lincoln, Nebr.).—W. l., 360 only.
WFAT (Sioux Falls, S. Dak.).—W. l., 360 only.
WPI (Philadelphia, Pa.).—W. l., 400 only.
WGR (Buffalo, N. Y.).—W. l., 360 only.
WGV (New Orleans, La.).—W. l., 360 only.
WHA (Madison, Wis.).—W. l., 360 only.
WHAM (Rochester, N. Y.).—W. l., 360 only.
WHB (Kansas City, Mo.).—W. l., 400 only.
WIAY (Washington, D. C.).—W. l., 360 only.
WJAG (Norfolk, Nebr.).—W. l., 360 only.
WKAA (Cedar Rapids, Iowa).—W. l., 360 only.
WLW (Cincinnati, Ohio).—W. l., 360 only.
WMC (Memphis, Tenn.).—W. l., 400 only.
WOC (Davenport, Iowa).—W. l., 400 only.
WOI (Ames, Iowa).—W. l., 360 only.
WOO (Philadelphia, Pa.).—W. l., 400 only.
WQAN (Scranton, Pa.).—W. l., 360 only.
WQAR (Muncie, Ind.).—Call signal changed to WJAF.
WRAF (Winter Park, Fla.).—Correct call signal WRAP.
WRAY (Scranton, Pa.).—W. l., 360 only.
WWJ (Detroit, Mich.).—W. l., 400 only.
Strike out all particulars of the following-named stations: KDZA, Tucson, Ariz.; KDZZ, Everett, Wash.; KZC, Seattle, Wash.; WBAG, Bridgeport, Pa.; WFAY, Independence, Kans.; WGAK, Macon, Ga.; WGAT, Lincoln, Nebr.; WIAZ, Miami, Fla.; WNAK, Manhattan, Kans.; WOZ, Richmond, Ind.; WPAV, Laurium, Mich.; WPAX, Thomasville, Ga.; and WSAS, Lincoln, Nebr.

GOVERNMENT LAND STATIONS, ALPHABETICALLY BY NAMES OF STATIONS.

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations, published by the Berne bureau.]

CHICAGO, ILL. (WWC).—Changed to Maywood, Ill.; call signal changed to KDQA.
CIRCLE, ALASKA.—W. l., add 1700, 2200.
FAIRBANKS, ALASKA.—System, Federal arc; w. l., 2000, 2600, 3200, 3700, 4100, 4700, 5000.
FORT EGBERT, ALASKA.—Range, 100; w. l., add 550, 575, 630.
FORT GIBBON, ALASKA.—System, Telefunken, 1000; w. l., 1100, 1275, 1875, 2200.
FORT ST. MICHAEL, ALASKA.—Range, 100; w. l., 450, 525, 550, *600*.
FORT YUKON, ALASKA.—System, R. C. A., 1000; w. l., *600*, 1000.
HOLY CROSS, ALASKA.—Range, 100; w. l., 410, 450, 525, 550.
IDITAROD, ALASKA.—Range, 100; w. l., 425, 510, 580, *600*.
LIVENGOOD, ALASKA.—W. l., add 520.
MCGRATH, ALASKA.—Range, 100.
NOME, ALASKA.—System, Federal arc, U. S. Navy arc and v. t. telephone and telegraph; w. l., 510, 550, 575, *600*, 3000, 3500, 4000, 5000.
NOORVIK, ALASKA.—Range, 100; w. l., 425, 475, 520, 550, *600*.

NULATO, ALASKA.—Range, 100; w. l., 655, 660, 730, 760.

Strike out all particulars of the following-named stations: Boston Light Vessel (L. V. No. 54), Brenton Reef Light Vessel (L. V. No. 39), Charleston Light Vessel (L. V. No. 34), Cross Rip Light Vessel (L. V. No. 20), Great Round Shoals Light Vessel (L. V. No. 66), Handkerchief Light Vessel (L. V. No. 3), Hedge Fence Light Vessel (L. V. No. 9), Hen & Chickens Light Vessel (L. V. No. 42), Martins Industry Light Vessel (L. V. No. 1), Minneapolis, Minn., Overfalls Light Vessel (L. V. No. 69), Pollock Rip Light Vessel (L. V. No. 47), Pollock Rip Slue Light Vessel (L. V. No. 73), Portland Light Vessel (L. V. No. 74), Ram Island Reef Light Vessel (L. V. No. 23), Relief Light Vessel No. 4, Relief Light Vessel No. 16, Relief Light Vessel No. 49, Relief Light Vessel No. 86, Scotland Light Vessel (L. V. No. 11), South Pass Light Vessel (L. V. No. 102), Stone Horse Shoal Light Vessel (L. V. No. 5), Tail of Horseshoe Light Vessel (L. V. No. 46), and Vineyard Sound Light Vessel (L. V. No. 41).

GOVERNMENT SHIP STATIONS, ALPHABETICALLY BY NAMES OF VESSELS.

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations, published by the Berne bureau.]

ALEXANDER HAMILTON. Range, 150; system, Navy-Simon, 1000; w. l., 300, *600*, 975, service PG.

AMARANTH.—Station operated and controlled by Lighthouse Service, Department of Commerce.

DISCOVERER.—Range, 200; system, U. S. Navy, 1000; w. l., 300, *600*, 1200.

FATHOMER.—Service, O; hours, X.

HYACINTH.—Station operated and controlled by Lighthouse Service, Department of Commerce.

MARINDUQUE.—Service, O; hours, X.

PIONEER.—Range, 200; system, U. S. Navy, 1000; w. l., 300, *600*, 1200; service, O; hours, X.

RELIEF LIGHTSHIP No. 53.—Name changed to "Relief."

RELIEF LIGHT VESSEL No. 78.—Name changed to "Relief."

RELIEF LIGHT VESSEL No. 90.—Name changed to "Relief."

WENONAH.—Station operated and controlled by U. S. Navy Department.

Strike out all particulars of the following-named vessels: Bothwell, Boyce, Carr, Cook, Earp, Iris, Johansson, Klingelhoefer, Knudsen, Larsen, Laurel, McGourty, Mehalatos, Natoma, Oveson, Richards, Scally, and Taylor.

GOVERNMENT LAND AND SHIP STATIONS, ALPHABETICALLY BY CALL SIGNALS.

WWC, changed to Maywood, Ill., call signal KDQA; NAJC, *read* Relief; NITR, *read* Relief; NITS, *read* Relief; strike out all particulars following the call signals KDPB, NABJ, NACX, NADX, NAFT, NAGT, NAJJ, NAKT, NALL, NALV, NAMS, NANS, NANT, NAPP, NAQB, NAQS, NART, NARV, NARX, NASB, NASK, NATD, NAZJ, NAZR, NAZV, NEJV, NEKC, NEKD, NEKF, NESC, NEXL, NEXP, NIDG, NIDL, NIGT, NIQP, NISC, NISD, NITB, NITK, NIZD, and NUGG.

SPECIAL LAND STATIONS, BY NAMES OF STATIONS.

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1922.]

AUSTIN, TEX. (5XX).—W. l., variable to 220.

BERKELEY, CALIF. (6XAY).—W. l., variable 200 to 500.

BOULDER, COLO. (9XAQ).—W. l., variable to 375.

BROOKLINE, MASS. (1XA).—W. l., 150, 250, 325.

CLEVELAND, OHIO (8XM).—W. l., 200, 375.

DALLAS, TEX. (5XADA).—Call signal changed to 5XBC.

DUBLIN, TEX. (5XAJ).—W. l., variable to 220.

FRESNO, CALIF. (6XU).—W. l., 200, 375, variable.

LOS ANGELES, CALIF. (6XD).—W. l., 200, variable.

NEW ORLEANS, LA. (5XAO).—W. l., variable 200 to 500.

NEWTON, MASS. (1XK).—W. l., variable 200 to 500.

NEW YORK, N. Y. (2XAT).—W. l., 220, 250, 275, 320.

NEW YORK, N. Y. (2XU).—W. l., 420, 3,000, 4,000.

PAWTUCKET, R. I. (1XAD).—W. l., variable 200 to 600.

PORTLAND, OREG. (7XL).—W. l., variable.
SAN DIEGO, CALIF. (6XAI).—W. l., 360.
SAN DIEGO, CALIF. (6XZ).—W. l., variable 200 to 360.
SCHENECTADY, N. Y. (2XA).—W. l., 200, variable.
SCHENECTADY, N. Y. (2XAE).—W. l., 200, 375.
STAPLETON, N. Y. (2XAC).—W. l., 200, variable.
URBANA, Ill. (9XJ).—W. l., variable to 375.
WINTER PARK, FLA. (4XK).—Station operated and controlled by C. J. Holdorf.
Strike out all particulars of the following-named stations: Bridgeport, Pa. (3XAE); Kearney, Nebr. (9ZAB); Olympia, Wash. (7ZP); Seattle, Wash. (7XT); St. Louis, Mo. (9ZV); and Whitford, Pa. (3ZT).

MISCELLANEOUS.

STATIONS VIOLATING SECTION 4, ACT OF AUGUST 13, 1912.

It has been brought to the attention of the department that some coast stations and ships in the vicinity of the coast are apparently violating the fourteenth regulation, section 4, act of August 13, 1912, which reads as follows: "In all circumstances, except in case of signals or radiograms relating to vessels in distress, all stations shall use the minimum amount of energy necessary to carry out any communication desired."

The penalties provided for this violation follow:

"For violation of any of these regulations, subject to which a license under sections 1 and 2 of this act may be issued, the owner of the apparatus shall be liable to a penalty of $100, which may be reduced or remitted by the Secretary of Commerce, and for repeated violations of any of such regulations the license may be revoked.

"For violation of any of these regulations, except as provided in regulation 19, subject to which a license under section 3 of this act may be issued, the operator shall be subject to a penalty of $25, which may be reduced or remitted by the Secretary of Commerce, and for repeated violations of any such regulations the license shall be suspended or revoked."

WAVE LENGTHS AND HOURS FOR VESSELS OF NORTH ATLANTIC ICE PATROL SERVICE.

The vessel on duty in the ice fields, call letters KFOG, transmits ice information on 600 meters at 6 a. m. and 6 p. m. and on 2,300 meters at 8.30 p. m., seventy-fifth meridian time. Radio operators will desist, as far as practicable, from operating at the above-cited times, in order that there be no interference.

ALASKA STATIONS REOPENED.

Akutan (KMW), opened April 22; Chisik Island (KUCP), opened April 14; False Pass (KJL), opened March 26; Hawk Inlet (KKAI), opened April 5; Nelson Lagoon (KXV), opened April 19; Port Althorp (KLW), opened April 3; Port Moller (KWR), opened April 14.

TITLE OF RADIO INSPECTORS CHANGED.

The title of all radio inspectors in charge of the different radio districts has been changed to "Supervisor of Radio." In future all correspondence should be addressed "Supervisor of Radio" in lieu of Radio Inspector.

NEW INTERNATIONAL LIST OF RADIOTELEGRAPH STATIONS.

The International Bureau of the Telegraph Union, Radiotelegraph Service, Berne, Switzerland, has advised this office that a new edition (eighth) of the International List of Radiotelegraph Stations is now ready for distribution. The price of this publication, together with all supplements, is 14 Swiss francs, including postage. All orders should be placed direct with the international bureau at Berne.

INFORMATION FROM THE HYDROGRAPHIC OFFICE.

Special time signal, Annapolis radio station, Md.—Arrangements have been made for the transmission of a series of special time signals from Annapolis, Md. (NSS), on a wave length of 17,145 meters c. w., from 3.55 to 4.00, seventy-fifth meridian time. These signals will take place daily from April 20 to October 15, 1923, and full power will be used.

Weather bulletins, Lake Michigan.—For the present all broadcasting of weather bulletins on the Great Lakes will be made from the United States naval radio station at Great Lakes (NAJ), in (approximately) latitude 42° 18′ 30″ N., longitude 87° 50′ 00″ W., by spark on wave length of 1,988 meters, as heretofore, the time of transmission (11.00, 12.00, 17.30, 23.00, 23.30, seventy-fifth meridian time) remaining unchanged.

Hydrographic information, Great Lakes.—Hydrographic information collected by the Hydrographic Office will be broadcast by the Great Lakes Naval Station (NAJ) at 10.45 a. m. and 5 p. m. on 4,650 meters c. w. These schedules will be copied by the naval station at Detour Point, Whitefish Point, Grand Marais, and Eagle Harbor and will be rebroadcast by each station at 11 a. m. and 5.15 p. m. on 600 meters, spark. Great Lakes station will rebroadcast the same information at 11 a. m. and 5.15 p. m. on 1,988 meters, spark. All times mentioned are seventy-fifth meridian.

Weather bulletin, Scheveningen, Holland.—On March 15 last the weather bulletins sent out by this station at 23.15 G. M. T. were discontinued. Storm warnings and notices to mariners, if necessary, will continue to be transmitted at the above hour, the former being preceded by the letters KNMI and the latter by the letters NBAZ.

Free medical advice by radio, Gothenburg.—Through cooperation between the Swedish telegraph administration and the hospital authorities of Gothenburg vessels at sea, regardless of nationality, may now obtain free medical advice through this station. The master of a vessel which is in need of medical advice should address a radiogram in Swedish, English, German, or French to the above-named station, stating briefly the symptoms of the person afflicted. This radiogram will be forwarded to the Allmanna and Sahlgrenska Hospital, from which free advice will be forwarded to the vessel through the Gothenburg station. All messages should be signed by the master of the vessel.

INFORMATION FROM THE BERNE BUREAU.

South Africa.—The coast station East London is open. The particulars of this station are as follows: Call letters, VNO; range, 60 miles; wave length, 600 meters; service, PG; hours, N; coast rate, 60 centimes per word; accounts are settled by the postmaster general at Pretoria.

Southwest Africa.—The coast station Walvis Bay is open to general public traffic.

Denmark.—Since February 1 last the coast rate of Danish stations is 30 centimes per word, minimum per radiogram 3 francs.

French Indo-China.—The coast stations, Fort Bayard and Kien, are now open for service.

Morocco.—Casablanca coast station now furnishes compass bearings. Each bearing is subject to a tax of 6 francs.

Great Britain.—The legal time in Great Britain will be advanced from April 22 to September 16 this year.

AMENDMENTS TO REGULATIONS, BROADCASTING STATIONS.

DEPARTMENT OF COMMERCE,
BUREAU OF NAVIGATION,
Washington, April 4, 1923.

Regulation 57, page 55, amended April 2, 1923, to read:

Class 2.—Limited commercial stations are not open to public service and are licensed for a specific commercial service or services defined in the license. Stations of this class must not transmit to or accept public messages from other stations. No rates are authorized.

Licenses of this class are required for all transmitting radio stations used for broadcasting news, music, lectures, church services, Government reports, and such matters, and do not permit the transmission of private or commercial communications.

The reading of telegrams or letters by broadcasting stations will not be construed as point-to-point communication so long as the signer is not addressed in person and so long as the text matter is of general interest.

Broadcasting stations must be operated by or under the supervision of an operator holding a commercial second-class license or higher; such operator must be on duty during the entire time the station is being operated.

No testing or experimenting is authorized in broadcasting stations between the hours of 10 a. m. and midnight, local standard time.

Broadcasting stations the operation of which interfere with the reception of time signals and meteorological information by marine service must remain silent while such signals are being transmitted.

Class A radiotelephone broadcasting stations.

Class A radiotelephone broadcasting station licenses will be issued to stations equipped to use power not exceeding 500 watts in the antenna and will be assigned a wave length between 222 meters (1,350 kilocycles) and 300 meters (1,000 kilocycles). Where more than one station of this class are licensed in the same city or locality a division of time will be required, if necessary.

Class B radiotelephone broadcasting stations.

A license will not be issued for a station in this class which does not comply in every respect with the specifications hereunder.

Specifications covering the requirements governing the construction, licensing, operating, and service of class B radiotelephone broadcasting stations:

Station.

Wave length.—The wave lengths between 300 and 345 and 375 and 545 meters only will be assigned for the use of stations of this class, which must be free from harmonics. Whenever necessary the use of a coupled circuit transmitter will be required. Hereafter but one wave length within these ranges, including the 400 meters wave length, will be assigned to any one locality.

Power.—The power supply must be dependable and nonfluctuating. The minimum required will be 500 watts in the antenna and the maximum shall not exceed 1,000 watts in the antenna.

Modulation.—The system must be so arranged as to cause the generated radio frequency current to vary accurately according to the sound impressed upon the microphone system.

Spare parts.—Sufficient tubes and other material must be readily available to insure continuity and reliability of the announced schedule of service.

Antenna.—The antenna must be so constructed as to prevent swinging.

Signaling system.—Some adequate and dependable system must be provided for communication between the operating room and the studio.

Studio.—The radio equipment in the studio must be limited to that essential for use in the room. The room shall be so arranged as to avoid sound reverberation and to exclude external and unnecessary noises.

Service.

Programs.—The programs must be carefully supervised and maintained to insure satisfactory service to the public.

Music.—The use of mechanically operated musical instruments is prohibited.

Division of time.—Where two or more stations of class B are licensed in the same city or locality a division of time will be required, if necessary.

Forfeiture of Class B privilege.

Licenses issued for the use of the wave lengths between 300 and 345 meters and 375 and 545 meters shall specifically provide that any failure to maintain the standards prescribed for such stations may result in the forfeiture of the class B privilege and relicensing of the station to use a wave length below 300 meters.

Class C radiotelephone broadcasting stations.

All radiotelephone broadcasting stations now licensed to use 360 meters (834 kilocycles) are placed in this class. No new licenses will be issued for stations to use this wave length. Renewal licenses for the use of 360 meters will be granted if desired.

REGULATIONS FOR BROADCASTING STATIONS.

The department has accepted the recommendations of the Second National Radio Conference, and immediate steps will be taken to put the plan into effect as far as found practicable.

The United States is divided into five zones with separate wave lengths designated for certain localities in each zone.

It is proposed to put the reallocation of wave lengths plan into effect at noon May 15, 1923.

Radio inspectors will notify the owners of all licensed class B stations of the wave length assigned for their locality under the new plan and advise those stations of this class who are not on 360 meters to make provisions to use the new wave length at the time specified. The new wave length must not be used for broadcasting prior to the date indicated. The use of the 400-meter wave length will not be permitted after May 15, 1923, except by the station to which this specific wave length is assigned under the new plan.

Hereafter all Government reports will be sent on the wave length assigned to the station, and the exclusive use of the 485-meter wave length will be discontinued for this service.

Stations now licensed to use 360 meters (now placed in class C) have the privilege of transferring to class A and using a wave length between 222 and 300 meters, which will be designated by the radio inspector, or, if they can qualify, transferring to class B and using the wave length designated for that locality within the band between 300 and 345 meters and 375 and 545 meters.

Where two or more stations of one class operate in the same city or locality a division of time will be required, if necessary.

VIOLATION OF ACT OF AUGUST 13, 1912, BY BROADCASTING STATIONS.

Under the reallocation of wave lengths plan effective May 15, 1923, it will be necessary for all transmitting radio stations to be accurately adjusted to the wave length specified in the license. Any variation from this rule may be considered a violation of section 2, act of August 13, 1912, justifying the revocation or suspension of the station license.

Beginning May 15 radio inspectors of each district will carefully check the transmitting wave lengths of stations in their districts by personal inspection of the stations as far as practicable and by listening in with accurately calibrated receivers and report to the department promptly any discrepancies observed.

The Bureau of Standards will transmit standard wave lengths from time to time which will be helpful in determining accurate wave lengths and will also listen in and check the wave lengths being used.

APRIL 27, 1923.

REGULATIONS AND SPECIFICATIONS GOVERNING THE LICENSING AND USE OF BROADCASTING DEVELOPMENT RADIO STATIONS.

Broadcasting development class.

To encourage scientific development of broadcasting and the apparatus used for this purpose, licenses of this class will be issued to owners of stations having transmitting and receiving equipment of their own design and manufacture provided in duplicate in all parts where, in the opinion of the Secretary of Commerce, failure is likely to occur. Such stations are to be used for the development and improvement of broadcasting, and to have adequate laboratory and manufacturing facilities and personnel with sufficient skill, training, and experience to insure progress in development work and the best obtainable quality of broadcasting.

All power radiated from the antenna of stations in this class shall be delivered to the antenna by means of coupled circuits, or such other means as will insure the same freedom from harmonics. The radiation must be sufficiently pure so that when tested by a sensitive receiver using a regenerative circuit with one tube and antenna at least 100 feet long and 30 feet high located 1 mile from the transmitter there shall be no evidence of any harmonic. Stations in this class will not be permitted to use power exceeding 1,000 watts in the antenna without special authority granted by the Secretary of Commerce.

Limited use of mechanically operated instruments will be permitted for test and development purposes only between the hours of 2 a. m. and 2 p. m.

Owners of stations in this class shall permit rebroadcasting of their programs by all other stations desiring to do so. The other stations will use the wave lengths assigned for their use. The development station will be equipped for transmitting and receiving special programs on such other wave lengths as may be designated for rebroadcasting by the Secretary of Commerce.

One or more radio operators holding commercial first-class licenses shall be on duty at the development station at all hours, maintaining a continuous watch, and required to render any assistance possible in an emergency in supplementing any existing public communication facilities temporarily interrupted.

No range competitions will be permitted where prizes or other valuable considerations are offered.

Licenses issued in this class shall specifically provide that the privileges authorized may be withdrawn whenever, in the opinion of the Secretary of Commerce, the station is not fully meeting all of the above specifications or such other regulations as may be made covering a station to be used for broadcasting development.

The wave length assigned to stations in this class will be changed immediately by the Secretary of Commerce whenever, in his opinion, the use of such wave length is not practical and such change is considered necessary.

D. B. CARSON,
Commissioner of Navigation.

Approved.

HERBERT HOOVER,
Secretary of Commerce.

LOADING COIL AND CONDENSERS FOR USE WITH SIMPLE RECEIVING SETS.

Bureau of Standards Circular 120, Construction and Operation of a Simple Homemade Radio Receiving Outfit, describes a simple type of crystal detector set which has an effective wave length range from about 200 to 600 meters. To receive longer waves, such as the time signals transmitted from Arlington on 2,650 meters, a loading coil may be used in connection with this set.

In Bureau of Standards Circular 137, which has recently appeared, there is given a description of a loading coil which, when used in connection with the set described in Circular 120, will permit the reception of waves up to about 3,000 meters. Many radio stations of considerable power operate on waves between 600 and 3,000 meters, and the use of this loading coil will therefore greatly increase the number of stations which it is possible to receive with this set.

In Circular 137 there is also given a description of a series-antenna condenser of fixed capacity and a by-pass condenser of fixed capacity to be connected in shunt with the telephone receivers. The use of the condenser in series with the antenna will improve reception on short wave lengths, such as 200 meters or shorter; the condenser here described has a capacity of about 300 micromicrofarads. The use of the telephone-shunt condenser will increase the intensity of signals received from some stations, particularly those using spark transmitting apparatus. The telephone-shunt condenser described has a capacity of about 1,500 micromicrofarads. Paraffined paper and tin foil are used in constructing these condensers.

Instructions are given for constructing and assembling the loading coil and the two condensers and for operating the receiving sets using these additional parts. The cost of the required material for the loading coil is about $3, and for the two condensers about 80 cents.

The title of Bureau of Standards Circular No. 137 is Auxiliary Condensers and Loading Coil Used with Simple Homemade Radio Receiving Outfits. A copy of this circular may be purchased for 10 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C.

DECIMAL CLASSIFICATION OF RADIO SUBJECTS.

In organizations actively engaged in radio work, such as manufacturing, operating, or selling companies, and radio-research laboratories, and in large libraries, there is a real demand for a convenient and comprehensive method of classifying the considerable volume and variety of printed matter, books, specifications, drawings, references, and other radio material which is constantly accumulating. A good method of classification by subject makes it possible to place the material covering related subjects near together in the file or on the shelf, instead of arranging the material simply in the order in which the various items are received.

The only valuable knowledge is the available. To be available, it must be so classified that it can at once be found. It is often much easier to hunt up a desired fact anew than to search for it among a mass of material which is unclassified or poorly classified.

Several years ago the staff of the radio laboratory of the Bureau of Standards felt the need for a suitable classification in connection with its own work. After some trials it appeared that a decimal system of classification would be very useful for this purpose, and a detailed decimal classification of radio subjects has been prepared at the bureau.

Persons connected with library work are familiar with the Dewey decimal classification, which assigns a classification number according to subject to every book which may be found in a library. The Dewey classification has been successfully used since

1876. The entire field of human knowledge is divided by the Dewey classification into nine main classes, and each main class is subdivided as minutely as may be required for the purpose of the particular library where it is used. It is flexible and can be easily adapted to any special requirements. It is convenient to have a special classification, such as a radio classification, so arranged that it will fit conveniently into a library where the Dewey classification is already in use. In the Dewey classification the number 621.384 represents radio communication, and the classification prepared at the Bureau of Standards is really a subdivision of this number. For the radio classification the abbreviation "R" is suggested to represent the number 621.384. Additions to the Bureau of Standards radio classification are occasionally made.

There has recently been issued Bureau of Standards Circular No. 138, A Decimal Classification of Radio Subjects—An Extension of the Dewey System. In the classification given in this publication the general field of radio communication is divided into nine main classes, each of which is subdivided as minutely as required. This classification is intended to be preeminently practical and to not sacrifice usefulness to any theoretical refinement.

This classification is used in classifying the references to current radio periodical literature which are printed in each issue of the RADIO SERVICE BULLETIN. Readers of the RADIO SERVICE BULLETIN will find it worth while to purchase a copy of this classification, since it will explain the significance of the numbers appearing before each reference in the list printed each month and considerably increase the usefulness of these reference lists. By selecting from the classification the numbers corresponding to the particular subjects in which he is interested a reader can quickly find in the reference list each month the references on those subjects. With a copy of the classification and a file of copies of the RADIO SERVICE BULLETIN available a person can therefore quickly locate the literature on a given radio subject.

In an organization in which only a comparatively small amount of material is to be classified it may be sufficient to use only the nine main classes, in which, for example, the number "R300" represents "Radio apparatus and equipment." In large organizations it may be desired to go into such detail, as "R342.2," which represents "Electron tube amplifiers using resistance coupling," or "134.45," "Principles of superregenerative action of electron tubes." An abbreviated classification is given which is suitable for organizations having a moderate amount of material to classify, and the alphabetical index makes it possible to readily refer to the classification number of any desired subject.

A copy of Bureau of Standards Circular No. 138 may be purchased for 10 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C.

REFERENCES TO CURRENT RADIO PERIODICAL LITERATURE.

The following list of references is prepared by the radio laboratory of the Bureau of Standards and is intended to cover the more important papers of interest to the professional radio engineer which have recently appeared in technical periodicals. Abstracts and articles which are essentially of amateur or novice interest are not listed.

A complete file of the lists in mimeographed form, previous to August 1, 1922, can be consulted at the Bureau of Standards in Washington. Files of earlier lists can also be consulted at the Library of Congress in Washington, the Engineering Societies Library in New York, and the John Crerar Library in Chicago.

These references are classified according to a decimal system described in detail in Bureau of Standards Circular No. 138, A Decimal Classification of Radio Subjects—An Extension of the Dewey System. A copy of this publication may be purchased for 10 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C. A notice briefly describing this publication appears elsewhere in this issue.

In this list the subjects corresponding to the 10 principal classes of the radio classification are given, and preceding each reference is given a number which corresponds to the classification of the reference. The subjects corresponding to the various decimal divisions of the 10 principal classes are not given in these lists, but can be found in the classification given in Bureau of Standards Circular 138. In case a reference could properly be assigned to two or more of the numbers of the classification, it appears only once in this list, with the number corresponding to the subject in connection with which the reference is of greatest importance.

In this list, under the first eight principal classes the numbers assigned to the references are preceded by the letter "R," which is an abbreviation for the number 621.384 which is assigned to radio communication in the regular Dewey decimal classification. Under the class "R900—nonradio subjects," the numbers shown in this list are not preceded by an "R," but are the numbers assigned to the subject of the reference in the regular complete Dewey classification.

The Bureau of Standards can not furnish copies of the various periodicals or other publications to which references are given. Copies of these publications may be secured from newsdealers or from publishers or may be consulted at libraries. Most United States Government publications to which references are given can be purchased at the prices stated from the Superintendent of Documents, Government Printing Office, Washington, D. C. Copies of United States patents can be secured for 10 cents each from the Commissioner of Patents, Washington, D. C.

R000.—*Radio communication.*

R007.1 Recommendations of radio conference: Department of Commerce asked to enlarge both broadcasting and amateur fields by opening up and readjusting wave bands. Electrical World, 81, p. 765, March 31, 1923.

R007.1 Approved wave allocation. Radio section of the New York Evening Mail, p. 7, March 31, 1923.

R007.5 British regulations governing radio reception. Radio News, 4, p. 1631, March, 1923.

R007.6 Législation en France: Réglementation des postes radioélectriques récepteurs. Radioélectricité, 4, pp. 16–17, January, 1923.

R007.8 Cuba follows United States in licensing stations by wave and power. Radio section of the New York Globe, p. 15, April 7, 1923.

R010 Seeley, W., Where your receivers come from. Wireless Age, 10, pp. 37–38, April, 1923.

R020 Haynes, F. H., The amateurs' book of wireless circuits. Wireless Press (Ltd.), London; price, 2 shillings 10 pence; post free.

R080 Tomkins, J. A., Wave length abacs: Simplifying inductance and capacity calculations. Wireless World and Radio Review, 11, pp. 823–825, March 24, 1923.

R100.—*Radio principles.*

R100 Marsten, J., Some comparisons between light waves and radio waves. Radio News, 4, pp. 1782–1783, April, 1923.

R111 Free, E. E., Radio and relativity (explanation of ether waves in the light of the Einstein theory). Popular Radio, 3, pp. 243–253, April, 1923.

R111 Twining, H. La V., Is there any ether? A complete reply. Radio Journal (Los Angeles), 2, pp. 8–10, January, 1923.

R111 Twining, H. La V., Nature of electricity and matter. Radio Journal (Los Angeles), 2, pp. 134–136, March, 1923.

R113 Lodge, O., Further peculiarities of wave transmission. Radio News, 5, p. 1936, May, 1923.

R113 Watson, W., Sur L'origine des parasites. Nature, 1922; L'Onde Électrique, 2, pp. 188–189, March, 1923.

R113 Brun, J., Les parasites—leur origine—leur élimination. Radioélectricité, 4, pp. 76–80, February, 1923.

R114 De Bellescize, H., Perturbations atmospheriques et communication par télégraphie sand fil (la selection des parasites par leur direction et leur phase). Radioélectricité, 4, pp. 113–120 March, 1923.

R114 Felder, L. R., High-frequency resistance and its measurement by means of the continuous wave oscillator. Radio News, 4, p. 1808, April; pp. 1947, May, 1923.

R114 Eccles, W. H., The problem of atmospherics and some suggestions for experimental investigation. Wireless World and Radio Review, 11, pp. 662–666, February 17, 1923.

R114 Austin, L. W., Receiving measurements and atmospheric disturbances at the U. S. Naval Radio Research Laboratory, Bureau of Standards, Washington, September and October, 1922. Proceedings Inst. Radio Engrs., 11, pp. 3–8, February, 1923.

R114 Radio waves and attenuation (transmission formula). Wireless Age, 10, p. 58, February, 1923.

R114 Discussion in "Observations of the field strength of Horsea wireless station." Journal Inst. Elec. Engrs. (London), 61, p. 308, February, 1923.

R114 De Bellescize, H., Perturbations atmospheriques et communications par télégraphie sans fil. Radioélectricité, 4, pp. 32–35, January; pp. 70–76, February, 1923.

R120 Eckersley, P., Problems of effective height of aerials. Electrician, 90, p. 134, February 9, 1923.

R120 The antenna: The transmitting station's radiating system. Wireless World and Radio Review, 11, pp. 652–655, February 17, 1923.

R124 Hémardinquer, P., Le problème de la réception de la téléphonie sans fil sur cadre. L'Onde Electrique, 2, pp. 159–167, March, 1923.

R124 Strock, M. S., Unidirectional receiving system. U. S. Patent No. 1449253, issued March 20, 1923.

R125.1 Robinson, J., Directional wireless. Modern Wireless (London), 1, pp. 129–133, March, 1923.

R125.1 Kolster, F. A., Radio method and apparatus (direction finding). U. S. Patent No. 1447165, issued February 27, 1923.

R125.1 Smith-Rose, R. L., and Barfield, R. H., Effect of local conditions on radio direction finding installations. Journal Inst. Elec. Engrs., 61, pp. 179–196, January, 1923; Electrical World, 81, p. 644, March 17, 1923.

R125.6 Beverage, H. H., Rice, C. W., Kellogg, E. W., The wave antenna: A new type of highly directive antenna. Journal American Inst. Elec. Engrs., 42, pp. 258–269, March; pp. 372–381, April, 1923.

R126 Bethenod, J., Théorie de la réception sur antenne horizontale de grande longueur. Radioélectricité, 4, pp. 30–32, January, 1923.

R130.3 Thermionic valve or electron tube—A question of nomenclature. Electrician, 90, p. 136, February 9, 1923.

R131 Best, G. M., Comparison of vacuum tube characteristics. Radio (San Francisco), 4, pp. 28–29, March, 1923.

R133 Van Aalst, M. F., Sur l'entretien des oscillations electriques par une lamp à trois électrodes. L'Industrie Electrique, 32, pp. 97–98, March 10, 1923.

R133 Mauz, E., Experimentelle Untersuchungen über Röhren-Tonsender mit Fremdsteuerung. Jahrbuch der drahtlosen Telegraphie, 21, pp. 2–22, January, 1923.

R133 Mauz, E., and Zenneck, J., Der Röhrentonsender mit Selbststeuerung. Jahrbuch der drahtlosen Telegrpahie, 21, pp. 22–30, January, 1923.

R134.5 Gothe, A., Erhöhung der Empfangsverstärkung und Abstimmschärfe durch mehrfache Frequenstransformation. Telefunken Zeitung, 5, pp. 32–35, January, 1923.

R134.5 Fromy, E., Etude d'un procédé de réception par modulation a une lampe. L'Onde Electrique 2, pp. 168–173, March, 1923.

R134.8 Phelps, B., The inverse duplex system of amplification. QST, 6, pp. 7–10, March, 1923.

R134.8 Cowper, A. D., Simultaneous amplification. Wireless World and Radio Review, 11, pp. 855–856, March 31, 1923.
R134.8 Scott-Taggart, J., Some new dual amplification circuits. Modern Wireless (London), 1, pp. 87–90, March, 1923.
R138 Slepian, J. Hot-cathode tube. U. S. Patent No. 1450265, issued April 3, 1923.
R138 Harris, J. E., and Schumacher, E. E., Measurements on the gases evolved from glasses of known chemical composition (exhausting of vacuum tubes). Bell System Technical Journal, 2, pp. 122–132, January, 1923.
R148 Stone, E. W., Modulation circuits and broadcasting. Radio (San Francisco), 5, pp. 17–18, April, 1923.
R148 Dickson, W. A., Modulation in radio telephony. Radio Topics, 3, pp. 15–16, March, 1923.
R148 Choke control modulation. Modern Wireless (London), 1, pp. 97–99, March, 1923.
R148 Heising, R. A., Signaling system (modulation). U. S. Patent No. 1448216, issued March 13, 1923.
R152 Oscillations à travers une étincelle de longueur variable. Radioélectricité, 4, pp. 63–70, February, 1923.

R200.—*Radio measurements and standardization.*

R200 The march of radio: A start on standardization. Radio Broadcast, 2, pp. 443–453, April, 1923.
R200 Development of radio standards: Institute of Radio Engineers and American Institute Electrical Engineers to cooperate in a standardization program. Wireless Age, 10, pp. 55–56, March, 1923.
R200 Hooper, S. C., The Navy's example in standardization. Radio Broadcast, 2, pp. 387–391, March, 1923.
R220 Bedeau, F., Étalonnage des capacités en valeur absolue au moyen des circuits à ondes entretenues. L'Onde Électrique, 2, pp. 74–90, February, 1923.
R225 Press, A., Stationary waves on open-ended solenoids. Journal Inst. Elec. Engrs. (London), 61, pp. 405–406, March, 1923.
R225 Marsten, J., Distributed capacity: Its effects, its measurements. Radio (San Francisco), 5, pp. 24–26, April, 1923.
R225 Morecroft, J. H., Further discussion on "Resistance and capacity of coils at radio frequencies." Proceedings Inst. Radio Engrs., 11, pp. 57–58, February, 1923.
R240 Higgitt, H. V., A bridge method of determining the effective resistance of an inductance coil or condenser. Electrician, 90, p. 114, February 2, 1923.
R240 MacLeod, H. J., The variation with frequency of the power loss in dielectrics. Physical Review, 21, pp. 53–73, January, 1923.
R270 Knudson, V. O., Sensibility of the ear to small differences of intensity and frequency. Physical Review, 21, pp. 84–102, January, 1923.
R270 Englund, C. R., Note on measurement of radio signals. Proceedings Inst. Radio Engrs., 11, pp. 26–33, February, 1923.
R281 Condensite celeron proves effective for panels and general insulation in the radio industry. Radio (Toronto), 5, pp. 42–43, February, 1923.
R281 Fleming on "dielectrics." American Radio Journal, 1, p. 2, April 1, 1923.
R281 Allsop, G., Dielectric losses. Beama (London), 58, pp. 105–108, February, 1923.
R281 O'Connor, P. J., How synthetic insulation is made and used. Radio Broadcast, 2, pp. 414–415, March, 1923.
R281.21 Campbell, W. A., Phenolic condensation products. Radio (Toronto), 5, pp. 35–38, March, 1923.
R281.21 Brown, D., Development of phenolic resins for insulation: Material of a thousand uses, demonstrates points of excellence for use in radio work. Radio Dealer, 1, p. 21, April, 1923.
R281.31 Riddle, F. H., The production of porcelain for electrical insulation. Journal American Inst. Elec. Engrs., 42, pp. 343–346, April, 1923.
R281.47 Rothberg, P., and Sach, A. P., Varnish (insulating material). U. S. Patent No. 1448869, issued March 20, 1923.
R281.47 Insulating varnishes, lacquers and compounds. Beama (London), 58, pp. 127–128, February, 1923.
R320.8 Elwell, C. F., The design of radio towers and masts: Wind pressure assumptions. Journal Institution Elec. Engrs. (London), 61, pp. 407–416, March, 1923.
R328 Meissner, A., Über Mehrfach-Antennenanlagen. Telefunken Zeitung, 5, pp. 11–16, January, 1923.
R331 Edmundson, H. W., and Munro, W. T., Vacuum electric discharge device. U. S. Patent No. 1450413, issued April 3, 1923.
R331 Jouaust, R., L'influence de traces de gaz dans les lampes à trois électrodes. L'Onde Électrique, 2, pp. 65–73, February, 1923.
R333 Pierce, G. W., Apparatus for and method of controlling electric current. U. S. Patent No. 1450749, issued April 3, 1923.
R333 Alleutt, C. T., Wireless amplifier. U. S. Patent No. 1450275, issued April 3, 1923.
R333 A new amplifying tube UV 201A and C 301A. QST, 6, pp. 27–28, March, 1923.
R333 Warner, J. C., Here are the facts about the UV 201A. Radio section of the New York Globe, p. 6, March 17, 1923.
R333 How to operate WD11 tube with one dry cell. Radio Topics, 3, pp. 25–26, March, 1923.
R340 Morris-Airey, H., The development of naval high-power valves. Electrical World, 81, pp. 433–434, March 10, 1923.
R340 Heising, R. A., Thermionic vacuum tube. U. S. Patent No. 1445278, issued February 13, 1923.
R341 Little, D. G., The hot-cathode rectifier as applied to radio transmitters. Electric Journal, 20, pp. 139–141, April, 1923.
R341 Cummings, B. R., The kenotron rectifier. Radio (Toronto), 5, pp. 18–19, March, 1923.
R342 Brillouin, L., A propos des divers schémas d'amplificateurs. Radioélectricité, 4, pp. 109–113, March, 1923.
R342 van der Bijl, H. J., Transmission system (amplifier). U. S. Patent No. 1445731, issued February 20, 1923.
R342.15 Reeves, J. H., Semiaperiodic high frequency transformers. Wireless World and Radio Review, 11, pp. 681–684, February 24, 1923.
R342.6 Haseltine, L. A., Tuned radiofrequency amplification with neutralization of capacity coupling. QST, 6, pp. 7–12, April, 1923.
R342.6 Ringel, A., The neutrodyne receiver. Wireless Age, 10, pp. 54–59, April, 1923.
R342.7 Lynch, A. H., Radiofrequency amplification from the ground up. Radio Broadcast, 2, pp. 393–397, March, 1923.
R342.7 Creswell, F., Building a radiofrequency amplifier. Radio Journal (Los Angeles), 2, p. 139, March, 1923.

R342.7 Universal two-stage amplifier in demand (audiofrequency with Reinartz or Flewelling circuit). Radio Section of New York Evening Mail, p. 2, March 3, 1923.

R343 Leithauser, G., Eine neue Audionschaltung deren Benutzung zum Bau eine Universalempfangers und über Gleichstromverstärker für Schreibempfang. Jahrbuch der drahtlosen Telegraphie, 21, pp. 30-32, January, 1923.

R343 McMeen, S. G., Receiving circuit experimentation. Radio (San Francisco), 5, pp. 12-14, April, 1923.

R343.5 Kimball, O. A., Building a superheterodyne and making it work. QST, 6, pp. 19-21, April, 1923.

R343.7 Lynch, A. H., Radiofrequency amplification from the ground up. Radio Broadcast, 2, pp. 499-503, April, 1923.

R344.3 Galbraith, R. A. H., Some theoretical considerations governing the design of continuous wave valve transmitters. Radio (Toronto), 5, pp. 35-38, February, 1923.

R344.3 5MS, the transmitting station of the Manchester Wireless Society. Wireless World and Radio Review, 11, pp. 715-718, March 3, 1923.

R344.7 Kendall, B. W., Generator and the generation of multiple frequencies. U. S. Patent No. 1446752, issued February 27, 1923.

R345 Carson, J. R., Translating circuit (modulator). U. S. Patent No. 1448702, issued March 13, 1923.

R345 Austin, E., Modulator. U. S. Patent No. 1449873, issued March 27, 1923.

R345 Pratt, J. B., Modulator. U. S. Patent No. 1449871, issued March 27, 1923.

R346 Baker, W. G., High-frequency signaling system. U. S. Patent No. 1449722, issued March 27, 1923.

R346 Carson, J. R., Method and means for signaling with high-frequency waves. U. S. Patent No. 1449382, issued March 27, 1923.

R346 Arnold, H. D., System of telephony. U. S. Patent No. 1449372, issued March 27, 1923.

R346 Baker, W. R. G., Electrical apparatus (tube). U. S. Patent No. 1445929, issued February 20, 1923.

R346 Arnold, H. D., Thermionic amplifier circuits. U. S. Patent No. 1448560, issued March 13, 1923.

R352 Delomme, E. M., The spark transmitter system of the Eiffel Tower. Wireless World and Radio Review, 11, pp. 851-854, March 31, 1923.

R352 Lesh, L. J., Spark-gap apparatus. U. S. Patent No. 1451426, issued April 10, 1923.

R352 Lesh, L. J., Spark-gap apparatus. U. S. Patent No. 1451427, issued April 10, 1923.

R353 Brunt, J., Chopper operation in arc transmission. Radio News, 5, p. 1976, May, 1923.

R364 Gehrig, W. H., Detector for wireless telephone outfits. U. S. Patent No. 1449148, issued March 20, 1923.

R364.1 Benaventure, B. T., Theory of operation of crystal detector. Radio News, 4, p. 1807, April, 1923.

R365.1 Electrolytic rectifier (from paper presented by F. A. Burgess before Wireless Association of Ontario). Radio (Toronto), 5, p. 39, March, 1923.

R365.3 Sweazy, K. M., The principles and construction of an electrolytic rectifier. Radio News, 4, p. 1643, March, 1923.

R365.3 Codd, M. A., Notes on electrolytic rectifiers. Electrical Review (London), 92, pp. 324-326, March 2, 1923.

R366 Kunnelly, M., Conférences données à l'Ecole supérieure des Postes et Télégraphes de Paris, sur le récepteur téléphonique. Journal Télégraphique, 46, pp. 25-30, February, 1923.

R366 Staunton, L. W., Radio receivers in the making. Radio (Toronto), 5, pp. 25-26, March, 1923.

R366 Kulka, E. R., Hot-wire telephone receiver (fine wire affected by heat moves diaphragm). Radio section of New York Globe, p. 8, March 24, 1923.

R366 Clarkson, R. P., Head 'phones and loud speakers. Radio section of New York Globe, p. 1, March 17, 1923.

R366.3 New developments in loud speaker horns. Radio News, 4, p. 1612, March, 1923.

R367 DeForest, L., Light controlling means. U. S. Patent No. 1449247, issued February 20, 1923.

R370 Humphreys, F. F., Adapting your set to the new wave bands (loading coils inserted boost range). Radio section New York Evening Mail, p. 1, April 7, 1923.

R380 Allen, G. Y., Jacks and how to use them. Radio Broadcast, 2, pp. 485-493, April, 1923.

R381 Meyer, U., Verlustmessung an Kondensatoren. Zeitschrift für Fernmeldetechnik, 4, pp. 1-6, January 16, 1923.

R381 Doyle, E. R., What a dealer should know about condensers. American Radio Journal, 1, p. 4, April 1, 1923.

R381 Marsten, J., Radio condensers. Radio News, 5, p. 1967, May, 1923.

R381 MacPherson, B., Electrical condenser. U. S. Patent No. 1446650, issued February 27, 1923.

R382 Turney, E. L., Spider web coils: Inventor tells of discovery of important part in radio. Radio Dealer, 1, p. 68, April, 1923.

R382 Schaffer, W., and Kruschinsky, F., Circuit arrangement for use in the transmission of signals. U. S. Patent No. 1446434, issued February 20, 1923.

R382 Doyle, E. R., Factors affecting the selection of inductances. American Radio Journal, 1, p. 5, March 1, 1923.

R383 Vincent, J. H., Beak, A. L., Paddington, L. C. C., Notes on high-frequency rheostats. Electrician, 90, p. 276, March 16, 1923.

R384.1 Hill, G., Combined wave changer and wave meter. U. S. Parent No. 1450038, issued March 27, 1923.

R384.1 Leib, A., Wave meter with cathode tube (three-electrode electron tube). U. S. Patent No. 1446425, issued February 20, 1923.

R384.1 Stevenson, G. H., Wave meter and similar electrical device. U. S. Patent No. 1448575, issued March 13, 1923.

R384.1 Steinmetz, B., Methods of using wave meters, with suggestions for insuring accuracy. Wireless Age, 10, pp. 73-74, March, 1923.

R385.5 Depew, J., The telephone and microphone. Radio News, 4, pp. 1789-1791, April, 1923.

R385.5 Lay, D., The remarkable new glow transmitter (microphone). Popular Radio, 3, pp. 290-294, April, 1923.

R385.5 Thomas, P., A diaphragm microphone for radio broadcasting. Journal American Inst. Elec. Engrs., 42, pp. 219-222, March, 1923.

R386 Goldberg, M. G., A study of filter systems for transmitter tube supply. QST, 6, pp. 14-17, April, 1923.

R386 Zobel, O. J., Theory and design of uniform and composite electric wave filters. Bell System Technical Journal, 2, pp. 1-46, January, 1923.

R388 Webb, R., Demonstration of a low-voltage cathode-ray oscillograph. Physical Society of London, 35, p. 127, 1923.

R388 Wood, A. B., The cathode-ray oscillograph. Physical Society of London, 35, pp. 109-124, February 15, 1923.

R400.—*Radio communication systems.*

R402 Réception d'émissions sur trés petites longueurs d'ondes (avis aux amateurs). L'Onde Electrique, 2, pp. 144-148, March, 1923.
R402 Roussel, La réception pratique des ondes courtes en radiotélégraphie. La Nature, 5, pp. 129-132, March 3, 1923.
R412 Dr. Nicholls on international radio telephony. Electrician, 90, p. 220, March 2, 1923.
R412 Carrier current demonstration of interest to power companies. Journal Electricity and Western Industry, 50, p. 164, March 1, 1923.
R413 Schudt, W. A., No sending "juice," try spark-tube set. Radio section New York Evening Mail, p. 3, April 14, 1923.
R430 Complaint that ringing subscribers interferes with radio. Telephony, 84, pp. 28-29, March 31, 1923.
R431 Russell, P. H., two simple arrangements for reducing interference and static with single circuit tuners. Radio News, 5, p. 1951, May, 1923.
R431 Espenschied, L., Radio receiving apparatus. U. S. Patent No. 1446890, issued February 27, 1923.
R431 Bernard, J. L., Eliminating interference from commercial power lines. Wireless Age, 10, p. 58, March, 1923.
R435 Hammond, J. H., jr., System for the transmission of radiant energy. U. S. Patent No. 1443361, issued January 30, 1923.
R460 Ranger, R. H., Method and means of receiving signals. U. S. Patent No. 1449911, issued March 27, 1923.
R460 Jammar, J. S., Duplex carrier wave system. U. S. Patent No. 1448808, issued March 13, 1923
R470 New use for carrier radio trouble reports are phoned over feeder trolley wires in New York City. Electrical World, 81, p. 764, March 31, 1923.
R470 Radiotelephony on transmission lines (system of the Societe Francaise Radio Electrique). Radio News, 4, p. 1776, April, 1923.
R470 Hartley, R. V. L., Relations of carrier and side bands in radio transmission. Proceedings Inst. Radio Engineers, 11, pp. 34-55, February, 1923.
R470 Broadcasting over light lines prevents interference. Radio News, 4, p. 1613, March, 1923.
R485 Nesper, E., Radio-Schnelltelegraphie. Elektrotechnische Zeitschrift, 42, pp. 237-241, March 15, 1923.

R500.—*Applications of radio.*

R510 Cole, G. E., Communications radiotélégraphiques maritimes modernes. Journal Télégraphique, 47, pp. 9-11, January 25, 1923.
R520 Die Telefunkenstation des Flugfeldes Waalhaven. Telefunken Zeitung, 5, pp. 35-37, January, 1923.
R520 Wood, R. S., Finding the way in cloudland (aerial navigation). Wireless Age, 10, pp. 41-42, March, 1923.
R530 Lengsfeld, A., Aufgabe und Zustellung von Funktelegrammen. Telefunken Zeitung, 5, pp. 46-48, January, 1923.
R545 Maxim, H. P., How young America built a National Radio Relay. Radio (Toronto), 5, pp. 22-23, March, 1923.
R545 Le poste d'étude d'un amateur. L'Onde Electrique, 2, pp. 181-186, March, 1923.
R545 Réflexions d'un amateur sur les essais transatlantiques. L'Onde Electrique, 2, pp. 149-152, March, 1923.
R545 Bouck, Z., One of the finest amateur stations alive. Radio Broadcast, 2, pp. 494-497, April, 1923.
R550 Snyder, J., Problems introduced by radio broadcasting. Radio (San Francisco), 4, pp. 31-32, March, 1923.
R550 Harbord, J. G., What radio broadcasting offers the farmer. Radio (Toronto), 5, pp. 15-17, March, 1923.
R550 Noble, W., Broadcasting as an aid to trade promotion. Electrician, 90, p. 332, March 30, 1923.
R550 La Radiophonie: Les radioconcerts de la Riviera. Radioelectricité, 4, pp. 81-86, March, 1923.
R560 Complete international list of broadcasting stations in the United States, England, Canada, etc. (compiled to April 1). American Radio Journal, 1, pp. 12-13, April 1, 1923.
R550 Principal radio broadcasting stations of the United States and Canada (with map of United States). Radio section of the New York Globe, pp. 14-15, March 31, 1923.
R551 Mitchell, W. G. W., Some practical applications of time signals. Wireless World and Radio Review, 11, pp. 751-754, March 10, 1923.
R570 Phillips, R., Controlling models by radio. Radio News, 4, pp. 1786-1787, April; pp. 1944-1946, May, 1923.
R580 Logwood, C. V., Application of radio telephony to police work. Radio (Toronto), 5, pp. 15-18, February, 1923.
R582 Davis, W., Seeing by radio (C. F. Jenkins prism ring). Popular Radio, 3, pp. 266-275, April, 1923.
R592 Coursey, P. R., "5WS" the successful transatlantic transmitting station of the Radio Society of Great Britain. Wireless World and Radio Review, 11, pp. 826-830, March 24, 1923.
R592 Longstaff, A. N., The future of radio in Canada. Radio (Toronto), 5, pp. 20-22, February, 1923.
R593 La Télégraphie sans fil sur la Côte d'Azur. Radio-électricité, 4, pp. 89-92, March, 1923.
R593 Metz, Captain, Les grandes postes Coloniaux Francais. L'Onde Electrique, 2, pp. 91-104, February, 1923.
R594 Die Grossfunkstelle Eilvese. Telefunken Zeitung, 5, pp. 26-32, January, 1923.
R594 Quack, E., Die transradio Betriebszentrale. Elektrotechnische Zeitschrift, 44, pp. 216-218, March 8, 1923.
R599 Telefunken auf der "Jaarbeurs" von Bandoeng (Java). Telefunken Zeitung, 5, pp. 22-26, January, 1923.
R599 Poland becomes a neighbor to the world. Wireless Age, 10, pp. 39-40, March, 1923.
R599 Cuba leads the way in international broadcasting with PWX. Wireless Age, 10, pp. 26-34, March, 1923.

R700.—*Radio manufacturing.*

R700 The march of radio: Monopolizing production of apparatus. Radio Broadcast, 2, pp. 335-363 March, 1923.
R740 Cliffe, R. N., What radio means to the merchant. American Exporter, 92, pp. 29-31, January, 1923.

R800.—*Nonradio subjects.*

347.7 The Mullard valve: Marconi appeal fails. Electrician, 90, p. 349, March 30, 1923.
347.7 Hoar, R. S., What good is a patent? What a patent is and is not. Radio Broadcast, 2, pp. 458-462, April, 1923.
347.7 Court decision may influence radio patent suits now on. Radio Dealer, 2, p. 16, March, 1923.
347.7 Kesler, C. H., Famous radio patents. Radio Broadcast, 2, pp. 407-413, March, 1923.
535.8 Coblentz, W. W., Optical method for producing pulsating electric current. U. S. Patent No. 1450061 issued March 27, 1923.
537.65 Cady, W. G., Piezo electric resonator. U. S. Patent No. 1450246, issued April 3, 1923
537.65 Russell, E. W. C., and Cotton, A. F. R., Commercial piezo-electricity. Electrical Review (London), 92, pp. 284-287, February 23, 1923.
621.313.3 McGown, D. B., Alternating current radio motors and generators. Radio (San Francisco), 4, pp. 25-26, March, 1923.
621.313.7 Fox, F. J., A closed-core magnetic rectifier. Radio (San Francisco), 5, pp. 29-31, April, 1923.
621.327.7 Heidbrink, J. A., Sensitized film holder for X-ray photography. U. S. Patent No. 1450420, issued April 3, 1923.
621.327.7 Bucky, G., Plate holder for taking Röntgen photographs. U. S. Patent No. 1449970, issued March 27, 1923.
621.327.7 Edwards, E. L., and Farwell, F. A., Safety X-ray apparatus. U. S. Patent No. 1450025, issued March 27, 1923.
621.327.7 Waite, H. F., Filter indicator for X-ray systems. U. S. Patent No. 1449357, issued March 20, 1923.
621.353 Hall, G. H., Making Edison "B" batteries for continuous wave transmission. QST, 6, pp. 23-25, March, 1923.
621.354.3 Graves, J., Carbon inserter for battery-core making machines. U. S. Patent No. 1446041, issued February 20, 1923.
621.382.8 Hahnemann, W., The oscillation engineering design of submarine acoustic signaling apparatus. Proceedings Inst. Radio Engineers, 11, pp. 9-25, February, 1923.
621.385 Clark, A. B., Telephone transmission over long cable circuits (telephone repeaters). Bell System Technical Journal, 2, pp. 67-94, January, 1923.

RADIO SIGNALS OF STANDARD FREQUENCY.

Radio signals of standard frequency will be transmitted from the Bureau of Standards at Washington, D. C. (station WWV), on the dates given below in May and June. These standard frequency signals are intended to be used for standardizing wave meters and adjusting transmitting and receiving apparatus. The proper adjustment of such apparatus is particularly important in connection with the reallocation of waves as recommended by the second radio conference held in Washington in March, 1923.

Methods for receiving and utilizing these signals for wave-meter calibration were published in the February issue of this bulletin; more detailed information may be obtained upon application to the Bureau of Standards. The announced values of these signals are accurate to better than three-tenths of 1 per cent. The schedule of these transmissions is given below.

Schedule of transmission.

Eastern standard time.	Signal.	Kilocycles (meters in parentheses).							
		May 1.	May 7.	May 11.	May 17.	May 23.	May 29.	June 4.	June 11.
11.00 to 11.04 p. m.	General call	400 (750)	400 (750)	900 (333)	250 (1499)	75 (3998)	1400 (214)	900 (333)	400 (750)
11.04 to 11.08 p. m.	Standard frequency								
11.08 to 11.11 p. m.	Announcements								
11.15 to 11.19 p. m.	General call	500 (600)	500 (600)	1000 (300)	250 (1199)	100 (2998)	1500 (200)	1000 (300)	500 (600)
11.19 to 11.23 p. m.	Standard frequency								
11.23 to 11.25 p. m.	Announcements								
11.30 to 11.34 p. m.	General call	600 (500)	600 (500)	1100 (273)	300 (999)	125 (2399)	1600 (187)	1100 (273)	600 (500)
11.34 to 11.38 p. m.	Standard frequency								
11.38 to 11.41 p. m.	Announcements								
11.45 to 11.49 p. m.	General call	700 (428)	700 (428)	1200 (250)	350 (857)	150 (1999)	1700 (176)	1200 (250)	700 (428)
11.49 to 11.53 p. m.	Standard frequency								
11.53 to 11.56 p. m.	Announcements								
12.00 to 12.04 a. m.	General call	800 (375)	800 (375)	1300 (231)	400 (750)	175 (1714)	1800 (167)	1300 (231)	800 (375)
12.04 to 12.08 a. m.	Standard frequency								
12.08 to 12.11 a. m.	Announcements								
12.15 to 12.19 a. m.	General call	900 (333)	900 (333)	1400 (214)	450 (666)	200 (1499)	1900 (158)	1400 (214)	900 (333)
12.19 to 12.23 a. m.	Standard frequency								
12.23 to 12.26 a. m.	Announcements								
12.30 to 12.34 a. m.	General call	1000 (300)	1000 (300)	1500 (200)	500 (600)	250 (1199)	2000 (150)	1500 (200)	1000 (300)
12.34 to 12.38 a. m.	Standard frequency								
12.38 to 12.41 a. m.	Announcements								

It should be especially noted that the above schedule lists the frequency in kilocycles and the wave lengths in meters, the latter being in parentheses. Wave length in meters is given by dividing 299820 by the number of kilocycles.

The "general call" is given by voice during the first half of the four-minute period and by continuous wave telegraph during the second half. This call is given to enable listeners to tune in WWV. The "standard frequency signals" consist of the call letters WWV (.−−.−− ...−) repeated with very long dashes intervening and are transmitted by unmodulated continuous waves. The "announcements" are made by voice during the first half of the period and by CW telegraphy during the latter half. The general call and the announcements are made on the same frequency as the standard frequency signals and may be used for some measurement purposes, but it is recommended that accurate measurements be made on the standard frequency signals only. With sensitive receiving apparatus it should be possible to receive these signals anywhere east of the Mississippi River.

ADDITIONAL COPIES
OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON, D. C.
AT
5 CENTS PER COPY
SUBSCRIPTION PRICE, 25 CENTS PER YEAR